TORQ Analysis of Operations Research Analysts to Computer Software Engineers, Applications

INPUT SECTION:

Transfer	Title	O*NET	Filters		
From Title:	Operations Research Analysts	15-2031.00	Abilities:	Importance LeveL: 50	Weight: 1
To Title:	Computer Software Engineers, Applications	15-1031.00	Skills:	Importance LeveL: 69	Weight: 1
Labor Market Area:	Maine Statewide		Knowledge:	Importance Level: 69	Weight: 1

OUTPUT SECTION:

Grand TORQ: 83

Ability TORQ	Skills TORQ	Knowledge TORQ
Level 88	Level 80	Level 80

Gaps To Narrow if Possible

Ability	Level	Gap	Impt
Speech Recognition	50	8	65
Speech Clarity	53	7	72
Information Ordering	60	5	68
Near Vision	57	4	75
Written Comprehension	67	3	72
Oral Comprehension	66	2	78
Deductive Reasoning	64	2	78

Upgrade These Skills

Skill	Level	Gap	Impt
Troubleshooting	90	30	86
Technology Design	75	20	83
Programming	90	11	98
Learning Strategies	66	13	69
Quality Control Analysis	75	12	74
Time Management	70	11	72
Coordination	70	8	71
Critical Thinking	83	1	96
Active Learning	81	1	85

Knowledge to Add

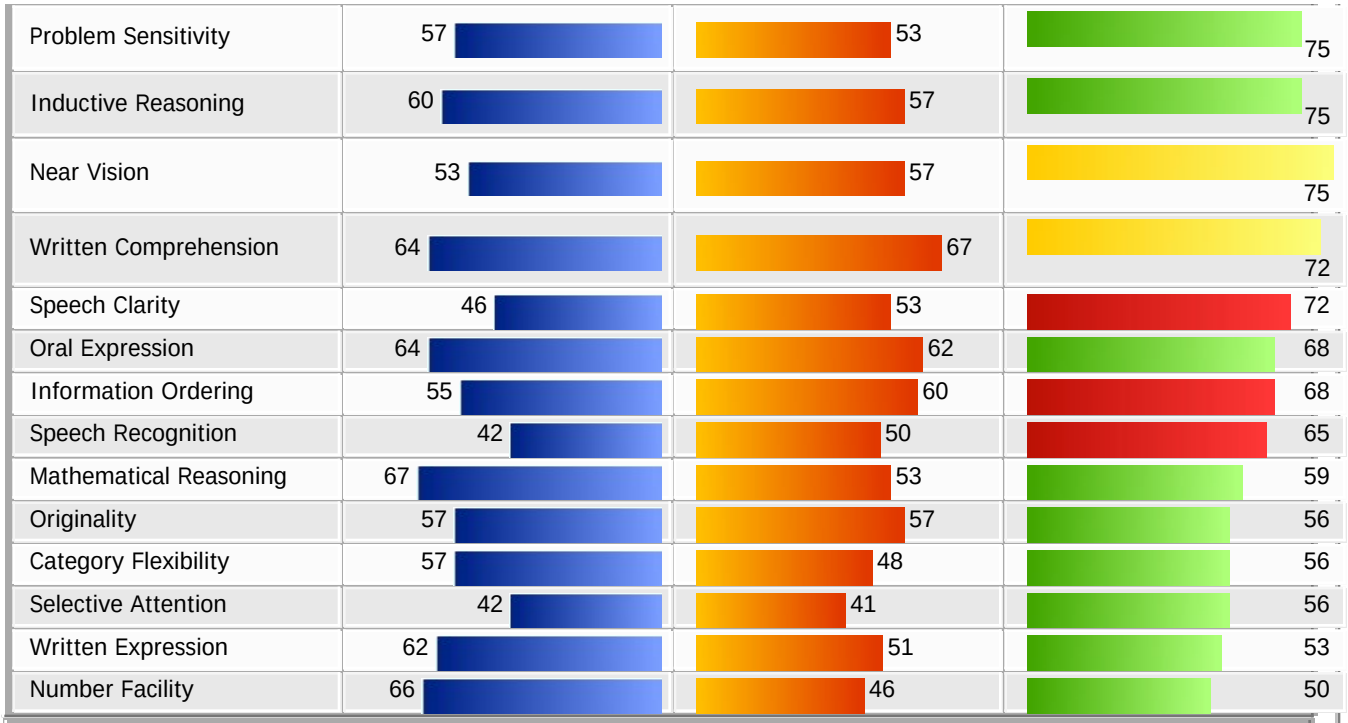
Knowledge	Level	Gap	Impt
Computers and Electronics	92	19	94
Engineering and Technology	70	1	71

LEVEL and IMPT (IMPORTANCE) refer to the Target Computer Software Engineers, Applications. GAP refers to level difference between Operations Research Analysts and Computer Software Engineers, Applications.

ASK ANALYSIS

Ability Level Comparison - Abilities with importance scores over 50

Description	Operations Research Analysts	Computer Software Engineers, Applications	Importance
Oral Comprehension	64	66	78
Deductive Reasoning	62	64	78



Skill Level Comparison - Abilities with importance scores over 69

Description	Operations Research Analysts	Computer Software Engineers, Applications	Importance
Programming	79	90	98
Critical Thinking	82	83	96
Complex Problem Solving	85	80	90
Troubleshooting	60	90	86
Active Learning	80	81	85
Technology Design	55	75	83
Judgment and Decision Making	82	74	83
Reading Comprehension	86	81	81
Operations Analysis	87	72	79
Systems Analysis	86	74	77
Quality Control Analysis	63	75	74
Active Listening	76	73	73
Speaking	71	69	73
Time Management	59	70	72
Coordination	62	70	71

Learning Strategies	53	66	69

Knowledge Level Comparison - Knowledge with importance scores over 69

Description	Operations Research Analysts	Computer Software Engineers, Applications	Importance
Computers and Electronics	73	92	94
Engineering and Technology	69	70	71

Experience & Education Comparison

Related Work Experience Comparison

Description	Operations Research Analysts	Computer Software Engineers, Applications
10+ years	0%	2%
8-10 years	0%	0%
6-8 years	4%	5%
4-6 years	8%	23%
2-4 years	29%	37%
1-2 years	8%	6%
6-12 months	8%	16%
3-6 months	0%	0%
1-3 months	0%	0%
0-1 month	0%	0%
None	41%	7%

Required Education Level Comparison

Description	Operations Research Analysts	Computer Software Engineers, Applications
Doctoral	12%	0%
Professional Degree	0%	0%
Post-Masters Cert	0%	0%
Master's Degree	70%	1%
Post-Bachelor Cert	0%	16%
Bachelors	16%	49%
AA or Equiv	0%	3%
Some College	0%	7%
Post-Secondary Certificate	0%	16%
High Scool Diploma or GED	0%	0%
No HSD or GED	0%	0%

Operations Research Analysts	Computer Software Engineers, Applications
Most Common Educational/Training Requirement:	
Master's degree	Bachelor's degree
Job Zone Comparison	
5 - Job Zone Five: Extensive Preparation Needed	4 - Job Zone Four: Considerable Preparation Needed
Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.	A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.
A bachelor's degree is the minimum formal education required for these occupations. However, many also require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).	Most of these occupations require a four - year bachelor's degree, but some do not.
Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.	Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Tasks

Operations Research Analysts	Computer Software Engineers, Applications

Core Tasks

Generalized Work Activities:

- Analyzing Data or Information - Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.
- Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.
- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Processing Information - Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Specific Tasks

Occupation Specific Tasks:

- Analyze information obtained from management in order to conceptualize and define operational problems.
- Break systems into their component parts, assign numerical values to each component, and examine the mathematical relationships between them.
- Collaborate with others in the organization to ensure successful implementation of chosen problem solutions.
- Collaborate with senior managers and decision-makers to identify and solve a variety of problems, and to clarify management objectives.
- Define data requirements; then gather and validate information, applying judgment and statistical tests.
- Design, conduct, and evaluate experimental operational models in cases where models cannot be developed from existing data.
- Develop and apply time and cost networks in order to plan, control, and review large projects.
- Develop business methods and procedures, including accounting systems, file systems, office systems, logistics systems, and production schedules.
- Formulate mathematical or simulation models of problems, relating constants and variables, restrictions, alternatives, conflicting objectives, and their numerical parameters.
- Observe the current system in operation,

Core Tasks

Generalized Work Activities:

- Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
- Updating and Using Relevant Knowledge - Keeping up-to-date technically and applying new knowledge to your job.
- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.
- Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Specific Tasks

Occupation Specific Tasks:

- Analyze information to determine, recommend, and plan computer specifications and layouts, and peripheral equipment modifications.
- Analyze user needs and software requirements to determine feasibility of design within time and cost constraints.
- Confer with systems analysts, engineers, programmers and others to design system and to obtain information on project limitations and capabilities, performance requirements and interfaces.
- Consult with customers about software system design and maintenance.
- Coordinate software system installation and monitor equipment functioning to ensure specifications are met.
- Design, develop and modify software systems, using scientific analysis and mathematical models to predict and measure outcome and consequences of design.
- Determine system performance standards.
- Develop and direct software system testing and validation procedures, programming, and documentation.
- Modify existing software to correct errors, allow it to adapt to new hardware, or to improve its performance.
- Obtain and evaluate information on factors such as reporting formats required, costs, and security needs to determine hardware configuration.
- Recommend purchase of equipment to control dust, temperature, and humidity in area of system installation.

and gather and analyze information about each of the parts of component problems, using a variety of sources.
- Perform validation and testing of models to ensure adequacy; reformulate models as necessary.
- Prepare management reports defining and evaluating problems and recommending solutions.
- Specify manipulative or computational methods to be applied to models.
- Study and analyze information about alternative courses of action in order to determine which plan will offer the best outcomes.

Detailed Tasks

Detailed Work Activities:

- advise clients or customers
- advise governmental or industrial personnel
- analyze operational or management reports or records
- analyze scientific research data or investigative findings
- assist with business or managerial research
- collect scientific or technical data
- collect statistical data
- communicate technical information
- compile numerical or statistical data
- confer with research personnel
- create mathematical or statistical diagrams or charts
- design computer programs or programming tools
- develop management control systems
- develop mathematical ideas or interpretations
- develop mathematical simulation models
- develop or maintain databases
- develop records management system
- develop tables depicting data
- direct and coordinate scientific research or investigative studies
- evaluate management programs
- explain complex mathematical information
- follow statistical process control procedures
- make presentations
- obtain information from individuals
- perform statistical modeling
- plan scientific research or investigative studies
- prepare reports
- prepare reports for management
- prepare technical reports or related

- Specify power supply requirements and configuration.
- Store, retrieve, and manipulate data for analysis of system capabilities and requirements.
- Supervise the work of programmers, technologists and technicians and other engineering and scientific personnel.
- Train users to use new or modified equipment.

Detailed Tasks

Detailed Work Activities:

- adjust computer operation system
- advise clients regarding engineering problems
- analyze technical data, designs, or preliminary specifications
- check hardware or software to determine reliability
- communicate technical information
- conduct performance testing
- conduct training for personnel
- consult with customers concerning needs
- design computer hardware or software interface
- design data processing systems
- design data security systems
- design electronic equipment
- design hardware or software systems
- design systems in cooperation with colleagues
- develop computer performance standards
- develop mathematical or computer languages
- develop mathematical simulation models
- develop or maintain databases
- develop tables depicting data
- evaluate computer system user requests or requirements
- evaluate prototype computer software systems
- follow data security procedures
- follow data storage procedures
- install hardware, software, or peripheral equipment
- make presentations
- monitor computer operation
- monitor equipment or machine operation to detect problems
- monitor operating conditions
- prepare technical reports or related documentation
- program computers for electronic engineering applications
- program computers using existing

documentation
- program computers for management analysis applications
- program computers using existing software
- provide expert testimony on research results
- recommend further study or action based on research data
- resolve engineering or science problems
- select business applications for computers
- use computer application flow charts
- use computers to enter, access or retrieve data
- use cost benefit analysis techniques
- use interpersonal communication techniques
- use knowledge of investigation techniques
- use library or online Internet research techniques
- use long or short term production planning techniques
- use mathematical or statistical methods to identify or analyze problems
- use object-oriented computer programming techniques
- use project management techniques
- use quantitative research methods
- use relational database software
- use scientific research methodology
- use spreadsheet software
- use statistical cost estimation methods
- use word processing or desktop publishing software
- write scholarly or technical research papers
- write technical specifications for computer systems, software or applications

Technology - Examples

Analytical or scientific software
- A mathematical programming language AMPL
- Business Forecast Systems Forecast Pro
- Claritas PRIZM NE
- ESRI ArcExplorer
- General algebraic modeling system GAMS
- Hyperion Solutions Hyperion Intelligence
- iGrafx software
- ILOG OPL-CPLEX Development System
- Imagine That Extend OR

software
- program mainframe computer
- provide technical computer training
- read blueprints
- read schematics
- read technical drawings
- recommend purchase, repair, or modification of equipment
- recommend software or hardware purchases
- resolve engineering or science problems
- revise or correct errors in computer programs, software, or systems
- supervise programming personnel
- test computer programs or systems
- train workers in use of equipment
- understand detailed electronic design specifications
- understand engineering data or reports
- use computer networking technology
- use computer programming language
- use computers to enter, access or retrieve data
- use knowledge of mainframe computers
- use project management techniques
- use scientific research methodology
- use spreadsheet software
- write computer software, programs, or code
- write documentation for computer programming
- write technical specifications for computer systems, software or applications

Technology - Examples

Analytical or scientific software
- Data analysis software
- SAS software
- Simulation program with integrated circuit emphasis SPICE

Application server software
- BEA WebLogic Server
- IBM WebSphere

Backup or archival software
- Backup and archival software

Computer aided design CAD software
- Computer assisted software engineering CASE software

Configuration management software
- Automated installation software

- Insightful S-PLUS
- LINDO Systems LINGO
- Mesquite Software CSIM
- Mixed integer optimizer MINTO
- ProModel software
- Rockwell Automation Arena
- SAS software
- SPSS software
- Stanford Business Software MINOS
- Stanford Business Software SNOPT
- Statistical software
- Telelogic System Architect
- The Mathworks MATLAB
- The MathWorks Simulink
- Wolfram Research Mathematica

Charting software

- Microsoft Office Visio

Computer aided design CAD software

- Mathsoft Mathcad

Computer aided manufacturing CAM software

- Dassault Systemes CATIA software

Data base management system software

- MySQL software

Data base reporting software

- Business Objects Crystal Reports
- Strategic Reporting Systems ReportSmith

Data base user interface and query software

- Microsoft Access
- Oracle software
- Structured query language SQL

Development environment software

- C
- Microsoft Visual Basic

Map creation software

- ESRI ArcGIS software
- Microsoft MapPoint

- Configuration management software
- Deployment software
- IBM Rational ClearCase
- Patch management software
- Visible Razor

Data base management system software

- Computer Associates integrated data management system CA-IDMS
- Data definition language DDL
- Data manipulation language DML
- Database management software
- IBM DB2
- Microsoft Access
- Microsoft SQL Server
- MySQL software
- Oracle DBMS
- Oracle procedural language/structured query language PL/SQL
- Sybase SQL Server

Data base user interface and query software

- ADO.NET
- IBM Rational ClearQuest
- Structured query language SQL
- Transact-SQL

Development environment software

- A programming language APL
- Activity based costing ABC
- Ada
- Algorithmic language ALGOL
- American National Standards Institute ANSI C
- AWK
- B
- Basic combined programming language BCPL
- Beginner's all-purpose symbolic instruction code BASIC

- Microsoft MapPoint

Object or component oriented development software

- C++
- R
- Sun Microsystems Java
- Sybase PowerBuilder

Office suite software

- Microsoft Office

Presentation software

- Microsoft PowerPoint

Project management software

- Microsoft Project

Spreadsheet software

- Microsoft Excel

Word processing software

- Microsoft Word

Tools - Examples

- Desktop computers
- Mainframe computers
- Laptop computers
- Personal computers

- Borland Delphi software
- Borland JBuilder
- C
- Class oriented ring associated language CORAL
- CLU
- Combined programming language CPL
- Common business oriented language COBOL
- Eclipse software
- Embedded systems development software
- Extensible markup language XML
- Flow-Matic
- Formula translation/translator FORTRAN
- FORTH
- Haskell
- IBM Rational Rose XDE Developer
- Icon
- Integrated development environment IDE software
- Interface definition language IDL
- J
- Kernel
- List processing language LISP
- Microsoft Visual Basic
- Microsoft Visual Basic Scripting Edition VBScript
- Microsoft Visual Studio
- ML
- MUMPS M
- National Instruments LabVIEW
- Parlog
- Pascal
- Programming language one PL/I
- Prolog
- Restructured extended executor REXX

- Ruby
- Scheme
- String oriented symbolic language SNOBOL
- Sun Microsystems Java 2 Platform Enterprise Edition J2EE
- Symantec Visual Caf
- Web service definition language WDSL
- XML Path Language XPATH

Document management software

- Document management software

Enterprise application integration software

- Enterprise application integration EAI software
- SAP Netweaver

File versioning software

- Version control software

Graphical user interface development software

- Graphical user interface GUI builder software

Object or component oriented development software

- BETA
- C++
- Categorical abstract machine language CAML
- Common extended self-containing prolog CESP
- Component object model COM software
- Distributed component object model DCOM software
- DRAGOON software
- E++
- Eiffel
- Emerald
- Extended self-containing Prolog ESP
- Lisp object-oriented programming system LOOPS
- Microsoft Visual Basic.NET
- Microsoft Visual C# .NET
- Modula

- Oberon
- Object or component oriented development software
- Objective-C
- Oblog
- Polka
- Practical extraction and reporting language Perl
- Python
- Sather
- Self
- Simulation language SIMULA
- Smalltalk
- Sun Microsystems Java

Office suite software

- Microsoft Office

Operating system software

- Job control language JCL
- Linux
- Operating system shells

Platform interconnectivity software

- Migration software

Presentation software

- Microsoft PowerPoint

Program testing software

- Defect tracking software
- Dynamic analysis software
- Functional testing software
- IBM Rational PurifyPlus
- Integration testing software
- Interoperability testing software
- Load testing software
- Mercury Interactive LoadRunner
- Mercury Interactive WinRunner
- Migration testing software
- Mutation testing software

- Recovery testing software
- Regression testing software
- Security testing software
- Source code editor software
- Static analysis software
- Stress testing software
- System testing software
- Test design software
- Test implementation software
- Unit testing software
- Usability testing software

Project management software

- Project management software

Requirements analysis and system architecture software

- IBM Rational Requisite Pro
- Requirements management software
- Unified modeling language UML

Spreadsheet software

- Microsoft Excel

Transaction security and virus protection software

- Encryption software

Transaction server software

- Apache software
- Customer information control system CICS software
- IBM Middleware
- Microsoft Internet Information Service IIS
- Object Management Group Object Request Broker
- Web server software

Web platform development software

- Adobe Systems Adobe Flex
- Apache Struts
- Cascading Style Sheets CSS
- Extensible HyperText Markup Language XHTML

• Extensible stylesheet language transformations XSLT
• Hypertext markup language HTML
• JavaScript
• Microsoft Active Server Pages ASP
• Microsoft ASP.NET
• PHP: Hypertext Preprocessor
• Ruby on Rails
Word processing software
• Microsoft Word
Tools - Examples
• Application servers
• Desktop computers
• Digital cameras
• Flash disks
• In circuit emulators ICE
• Mainframe computers
• Notebook computers
• Personal digital assistants PDA

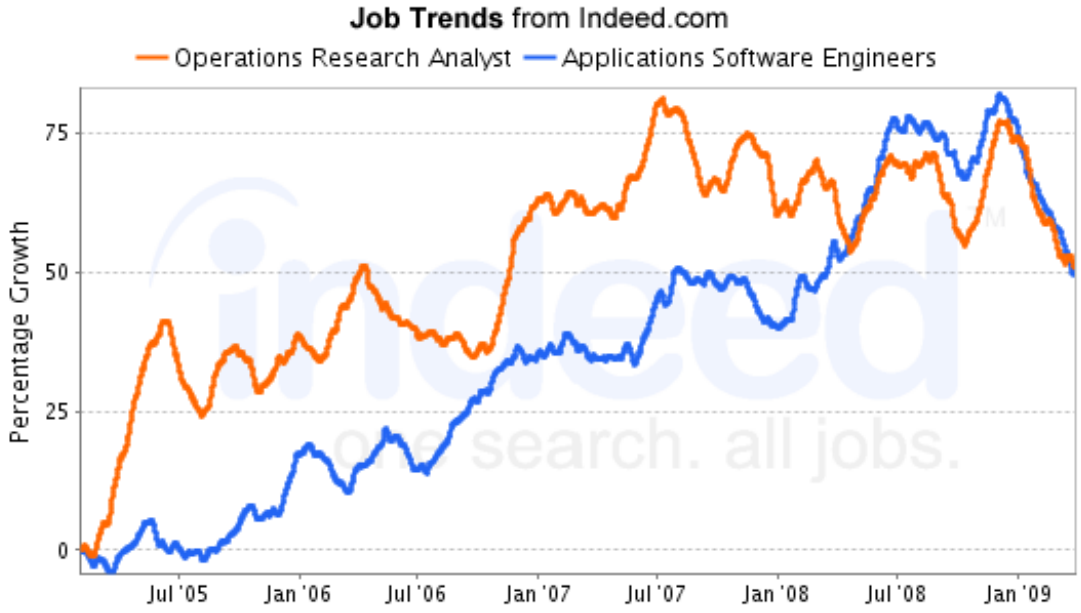
Labor Market Comparison

Description	Operations Research Analysts	Computer Software Engineers, Applications	Difference
Median Wage	$ 64,140	$ 63,750	$(390)
10th Percentile Wage	$ 41,690	$ 39,910	$(1,780)
25th Percentile Wage	N/A	N/A	N/A
75th Percentile Wage	$ 75,720	$ 74,900	$(820)
90th Percentile Wage	$ 87,250	$ 85,260	$(1,990)
Mean Wage	$ 63,700	$ 62,580	$(1,120)
Total Employment - 2007	180	1,060	880
Employment Base - 2006	187	1,045	858
Projected Employment - 2016	210	1,360	1,150
Projected Job Growth - 2006-2016	12.3 %	30.1 %	17.8 %

Projected Annual Openings - 2006-2016	6	47	41

National Job Posting Trends

Trend for Operations Research Analysts	Trend for Computer Software Engineers, Applications



Data from Indeed

Recommended Programs

Artificial Intelligence and Robotics

Artificial Intelligence and Robotics. A program that focuses on the symbolic inference, representation, and simulation by computers and software of human learning and reasoning processes and capabilities, and the modeling of human motor control and motions by computer-driven machinery. Includes instruction in computing theory, cybernetics, human factors, natural language processing, robot design, and applicable aspects of engineering, technology, and specific end-use applications.

No schools available for the program

Information Technology

Information Technology. A program that focuses on the design of technological information systems, including computing systems, as solutions to business and research data and communications support needs. Includes instruction in the principles of computer hardware and software components, algorithms, databases, telecommunications, user tactics, application testing, and human interface design.

Institution	Address	City	URL
University of Maine		Orono	www.umaine.edu/

Programming

Computer Programming/Programmer, General. A program that focuses on the general writing and implementation of generic and customized programs to drive operating systems and that generally prepares individuals to apply the methods and procedures of software design and programming to software installation and maintenance. Includes instruction in software design, low- and high-level languages and program writing; program customization and linking; prototype testing; troubleshooting; and related aspects of operating systems and networks.

Institution	Address	City	URL
Wasington County Community College	One College Drive	Calais	www.wccc.me.edu
Northern Maine Community College	33 Edgemont Dr	Presque Isle	www.nmcc.edu

Information Sciences and Systems

Information Science/Studies. A program that focuses on the theory, organization, and process of information collection, transmission, and utilization in traditional and electronic forms. Includes instruction in information classification and organization; information storage and processing; transmission, transfer, and signaling; communications and networking; systems planning and design; human interfacing and use analysis; database development; information policy analysis; and related aspects of hardware, software, economics, social factors, and capacity.

Institution	Address	City	URL
Eastern Maine Community College	354 Hogan Rd	Bangor	www.emcc.edu

Computer Science

Computer Science. A general program that focuses on computers, computing problems and solutions, and the design of computer systems and user interfaces from a scientific perspective. Includes instruction in the principles of computational science, and computing theory; computer hardware design; computer development and programming; and applications to a variety of end-use situations.

Institution	Address	City	URL
Bowdoin College	5700 College Station - President's Office	Brunswick	www.bowdoin.edu
Bowdoin College	5700 College Station - President's Office	Brunswick	www.bowdoin.edu
University of Maine at Farmington	224 Main St	Farmington	www.umf.maine.edu
University of Maine at Farmington	224 Main St	Farmington	www.umf.maine.edu
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/
University of Southern Maine	96 Falmouth St	Portland	www.usm.maine.edu
University of Southern Maine	96 Falmouth St	Portland	www.usm.maine.edu
University of Southern Maine	96 Falmouth St	Portland	www.usm.maine.edu
Colby College	Mayflower Hill Drive	Waterville	www.colby.edu
Colby College	Mayflower Hill Drive	Waterville	www.colby.edu

Computer Engineering

Computer Engineering, General. A program that generally prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of computer hardware and software systems and related equipment and facilities; and the analysis of specific problems of computer applications to various tasks.

Institution	Address	City	URL
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/

University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/

Computer Software Engineering

Computer Software Engineering. A program that prepares individuals to apply scientific and mathematical principles to the design, analysis, verification, validation, implementation, and maintenance of computer software systems using a variety of computer languages. Includes instruction in discrete mathematics, probability and statistics, computer science, managerial science, and applications to complex computer systems.

No schools available for the program

Computer Engineering Technologies/Technicians, Other

Computer Engineering Technologies/Technicians, Other. Any instructional program in computer engineering technologies not listed above.

No schools available for the program

Bioinformatics

Bioinformatics. A program that focuses on the application of computer-based technologies and services to biological, biomedical, and biotechnology research. Includes instruction in algorithms, network architecture, principles of software design, human interface design, usability studies, search strategies, database management and data mining, digital image processing, computer graphics and animation, CAD, computer programming, and applications to experimental design and analysis and to specific quantitative, modeling, and analytical studies in the various biological specializations.

No schools available for the program

Medical Informatics

Medical Informatics. A program that focuses on the application of computer science and software engineering to medical research and clinical information technology support, and the development of advanced imaging, database, and decision systems. Includes instruction in computer science, health information systems architecture, medical knowledge structures, medical language and image processing, quantitative medical decision modeling, imaging techniques, electronic medical records, medical research systems, clinical decision support, and informatics aspects of specific research and practice problems.

No schools available for the program

Medical Illustration and Informatics, Other

Medical Illustration and Informatics, Other. Any instructional program in medical illustration and informatics not listed above.

No schools available for the program

Maine Statewide Promotion Opportunities for Operations Research Analysts

O*NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings
15-2031.00	Operations Research Analysts	100	5	180	$64,140.00	$0.00	12%	6
13-2051.00	Financial Analysts	83	4	210	$71,380.00	$7,240.00	10%	4
15-1032.00	Computer Software Engineers, Systems Software	83	4	290	$73,410.00	$9,270.00	11%	8
19-2012.00	Physicists	82	5	50	$93,210.00	$29,070.00	-4%	1
11-3021.00	Computer and Information Systems Managers	80	5	870	$83,130.00	$18,990.00	8%	21

17-2112.00	Industrial Engineers	80	4	580	$68,350.00	$4,210.00	11%	22
17-2071.00	Electrical Engineers	80	4	260	$73,050.00	$8,910.00	-10%	6
17-2131.00	Materials Engineers	80	4	40	$70,250.00	$6,110.00	-7%	1
17-2121.02	Marine Architects	80	4	60	$75,520.00	$11,380.00	-9%	1
13-2052.00	Personal Financial Advisors	79	3	360	$94,100.00	$29,960.00	10%	13
17-2141.00	Mechanical Engineers	79	4	620	$67,210.00	$3,070.00	-9%	14
19-2043.00	Hydrologists	79	5	130	$71,270.00	$7,130.00	16%	5
17-2041.00	Chemical Engineers	78	4	170	$81,330.00	$17,190.00	-17%	5
11-9121.00	Natural Sciences Managers	78	5	180	$79,810.00	$15,670.00	8%	5
11-9041.00	Engineering Managers	77	5	720	$91,030.00	$26,890.00	-2%	14

Top Industries for Computer Software Engineers, Applications

Industry	NAICS	% in Industry	Employment	Projected Employment	% Change
Computer systems design and related services	541500	31.30%	158,601	256,965	62.02%
Software publishers	511200	7.28%	36,910	57,030	54.51%
Management of companies and enterprises	551100	4.37%	22,123	30,604	38.34%
Management, scientific, and technical consulting services	541600	3.16%	16,005	34,287	114.23%
Data processing, hosting, and related services	518200	2.58%	13,076	21,212	62.23%
Federal government, excluding postal service	919999	2.55%	12,903	14,638	13.44%
Navigational, measuring, electromedical, and control instruments manufacturing	334500	2.52%	12,763	14,663	14.89%
Securities and commodity contracts, brokerages, and exchanges	5231-2	2.42%	12,276	21,910	78.47%
Research and development in the physical, engineering, and life sciences	541710	2.39%	12,110	15,504	28.03%
Professional and commercial equipment and supplies merchant wholesalers	423400	2.39%	12,097	16,922	39.88%
Aerospace product and parts manufacturing	336400	2.28%	11,538	14,101	22.21%
Computer and peripheral equipment manufacturing	334100	2.15%	10,883	8,549	-21.45%
Colleges, universities, and professional schools, public and private	611300	1.81%	9,193	12,341	34.25%

Self-employed workers, primary job	000601	1.59%	8,071	10,318	27.84%
State government, excluding education and hospitals	929200	1.55%	7,869	9,266	17.75%

Top Industries for Operations Research Analysts

Industry	NAICS	% in Industry	Employment	Projected Employment	% Change
Management, scientific, and technical consulting services	541600	9.10%	5,311	9,058	70.57%
Computer systems design and related services	541500	8.26%	4,822	6,221	29.00%
State government, excluding education and hospitals	929200	6.33%	3,695	3,464	-6.24%
Federal government, excluding postal service	919999	6.31%	3,682	2,993	-18.71%
Management of companies and enterprises	551100	5.97%	3,484	3,837	10.14%
Depository credit intermediation	522100	4.87%	2,840	2,766	-2.59%
Data processing, hosting, and related services	518200	3.95%	2,303	2,974	29.16%
Wired telecommunications carriers	517100	2.41%	1,409	1,057	-24.99%
Research and development in the physical, engineering, and life sciences	541710	2.40%	1,402	1,429	1.93%
Local government, excluding education and hospitals	939300	2.19%	1,275	1,369	7.33%
Professional and commercial equipment and supplies merchant wholesalers	423400	2.14%	1,246	1,388	11.37%
Colleges, universities, and professional schools, public and private	611300	2.10%	1,227	1,311	6.89%
Other nondepository credit intermediation, including real estate credit and consumer lending	522290	1.99%	1,164	1,333	14.58%
Securities and commodity contracts, brokerages, and exchanges	5231-2	1.84%	1,076	1,505	39.85%
General medical and surgical hospitals, public and private	622100	1.77%	1,035	1,094	5.78%

